

**REMARKS**

Claims 1, 3-7, and 9-16 are all the claims pending in the application.

Applicants acknowledge that the Examiner has wide discretion in entering an Amendment after a final Action. In the present case, however, Applicants have merely clarified claims 1 and 15 via a non-narrowing amendment, and have not added any new elements thereto that would require further consideration and/or search. Accordingly, Applicants respectfully request that the Examiner enter and consider the Amendment.

**I. Paragraph Nos. 1-4: Rejections Under 35 U.S.C. § 112**

Claims 1 and 15 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention.

Claims 1 and 15 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite.

**Applicants' Response**

Applicants respectfully traverse.

Claim 1, as originally filed, recited "at least one covering layer comprising a covering material." The covering material was defined to include an organic and inorganic compound, wherein the inorganic compound has a layered structure, and the organic compound is inserted between the layers of the inorganic compound.

By the Amendment of April 9, 2002, Applicants merely intended to clarify that the covering material's inorganic compound having an organic compound inserted between its layers was a composite material in the form of particles of a nanometer order, *i.e.*, a nanocomposite material. Applicants believe that claim 1, as amended on April 9, 2002, satisfied each of the

requirements of §112.

Nevertheless, in order to quickly advance the prosecution, Applicants have amended claim 1 to recite that the at least one covering layer comprises a composite material. In other words, the at least one covering layer includes (without excluding additional, unrecited elements) a composite material as defined in the remainder of claim 1. Applicants believe that amended claim 1 satisfies each of the requirements of §112.

The description at, for example, page 2, lines 6-19 supports amended claim 1.

The Examiner has asserted that it is unclear "whether the cable is coated or insulated with composite particles per se or coated with a polymeric base resin filled with inorganic particles" (Applicants refer to the last line at paragraph No. 4 of the Action).

Applicants respectfully disagree, and kindly direct the Examiner's attention to, *e.g.*, page 7, line 26 through page 8, line 8. Therein, it is stated that to make the protective coating of an optical fiber with the covering material of the present invention, the treated inorganic compound, *i.e.*, the composite material particles, is mixed with an organic compound, *e.g.*, a polymer matrix. The Examiner may also refer to the fifth full paragraph at page 6 of the specification.

Applicants respectfully request that the Examiner reconsider and withdraw these §112 rejections.

## **II. Paragraph Nos. 6-9: Rejection Under 35 U.S.C. § 103**

Claims 1, 3-7, and 9-16 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,173,960 to Dickinson ("Dickinson") in view of U.S. Patent Nos. 4,018,983 and 4,018,962 to Pedlow ("Pedlow '983" and "Pedlow '962", respectively).

### **Applicants' Response**

The Examiner has taken the position that the formation of a composite material, wherein the organic material is inserted between the layers of the inorganic particles, "is a necessary result when expand/exfoliated/intercalated inorganic particulate materials, having known layered

structures, are mixed with a resin."

Applicants respectfully disagree.

As explained throughout the present specification, the inorganic compound has been treated to allow the organic compound to be inserted between the layers of the inorganic compound (*see*, page 2, lines 6-9; page 5, lines 5-22; page 6, lines 25-35; and page 8, line 1). This element of the present invention is specifically recited in independent claim 1.

The cited references, either alone or combination, do not disclose or suggest this element of the claims.

The primary reference, Dickinson, discloses a cable including a barrier that is disposed between a fire source and the plastic insulation (*see*, column 4, lines 45+). The barrier includes an organic base resin and an additive system. The barrier may be included in a jacket. The additive system includes at least a first inorganic oxide having a low melting point and a second inorganic oxide having a high melting point. The additive system may also include other constituents, like mica, that provide a heat barrier (col.5, lines 49 and 59-63).

Although Dickinson's additive system may include an inorganic oxide such as mica, Dickinson is silent with respect to treating the inorganic oxide to allow an organic compound to be inserted between its layers. In fact, the composition disclosed in Dickinson corresponds to the prior art mentioned in this application (*see*, page 1, lines 21-24).

Likewise, both Pedlow '962 and Pedlow '983 are silent with respect to treating an inorganic compound such that an organic compound may be inserted between its layers.

Pedlow '962 discloses a flame-resistant tape comprising a base sheet fabric coated with a thermoplastic resinous material filled with a heat stable fiber and **heat activated foaming, fireproofing and intumescent substances** (*see*, column 1, lines 11-17). The resinous base composition further has incorporated intumescent or heat foamable substances (*see*, column 2, lines 50-52).

Pedlow '962's composition preferably further includes intumescent or foaming

components that constitute a porous inorganic body that occludes air or moisture. **Upon heating, the porous body tends to expand** by release of the occluded air or vaporization of absorbed or bound moisture (*see*, column 5, lines 3-10). Such components may be mica such as expanded or unexpanded vermiculite, bentonite (*see*, column 5, lines 3-10).

When the temperature becomes high, *e.g.*, from fire, the trapped fluid (air or moisture) expands and the volume of the filler increases forming a heat protective foam. At ambient temperature, the intumescent or foaming component is not expanded, or very less expanded (vermiculite) than at high temperature. By the effect of heat, a volume change occurs *in situ* in the tape.

It must be noted that the vermiculite is expanded before it is to be mixed with the thermoplastic resinous material, so its expansion is not due to the presence of an inorganic compound.

On the other hand, in the claimed invention, the modified inorganic compound is expanded by insertion of an organic compound between the layer, before being put in the form of a covering layer.

It must also be noted that the inorganic component described by Pedlow '962 does not include an organic component -- it is only a porous body containing air or moisture.

Thus, Pedlow '962 does not disclose or suggest the claimed invention, and the combined disclosures of Dickinson and Pedlow '962 cannot and do not lead a person of ordinary skill in the art to the claimed invention.

As for Pedlow '983, it discloses a sheathing composition wherein the resinous base is a solid thermoplastic (*see*, column 2, lines 34-38). The composition further includes intumescent or foaming components that constitute a porous inorganic body that occludes air or moisture and that upon heating tends to expand as a foamy body by release of the occluded air or vaporization of absorbed or bound moisture (*see*, column 4, lines 39-46). Such components may be mica such as expanded or unexpanded vermiculite, bentonite (col.5, lines 3-10).

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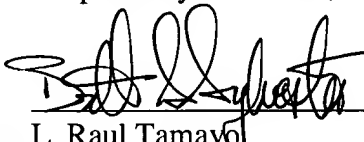
Thus, Pedlow '983 fails to disclose or suggest the claimed invention for the same reasons as explained above for Pedlow '962.

Because the cited art fails to disclose or suggest each and every element of the claimed invention, the present §103 rejection cannot stand, and Applicants respectfully request its withdrawal.

### III. Conclusion

Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

  
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**APPENDIX**

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS:**

**The claims are amended as follows:**

1. (Twice amended) A cable comprising at least one optical fiber and at least one covering layer ~~comprising a covering material~~ comprising a composite material, wherein:

said composite material is in the form of particles, and said particles have a size of nanometer order and include an organic compound and an inorganic compound;

said inorganic compound (i) is graphite or an inorganic oxide, (ii) has a layered structure, and (iii) has been treated to allow said organic compound to be inserted between the layers of said inorganic compound; and

said organic compound is selected from the group consisting of polymers, monomers, and oligomers, and is inserted between the layers of said inorganic compound.

15. (Twice amended) A method of manufacturing a cable according to any one of claims 1, 3-7 and 9-11, wherein the composite material ~~of said covering material~~ is made by the following steps:

said inorganic compound is in the form of particles having an initial size of micron order, and said inorganic compound particles are treated with an agent so as to ensure that said inorganic compound particles are compatible with said organic compound;

said treated inorganic compound is mixed with said organic compound at a temperature higher than the softening temperature or melting temperature of said organic compound; and

said composite material is obtained, wherein said composite material is in the form of particles, said composite material particles have a size of nanometer order, and said composite

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material particles comprise said organic compound inserted between the layers of said inorganic compound.